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ENVIRONMENT

Mr. Keith M. Krawczyk
Project Coordinator
MDEQ-RRD-Superfund
Constitution Hall – 3rd Floor South
525 West Allegan Street
Lansing, Michigan 48909-7926

Subject:
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
King Highway Landfill Operable Unit 3 (KHL OU)
Investigation Plan for Off-Site Landfill Gas Migration at the King Highway Landfill

Date:
March 13, 2013

Contact:
Patrick McGuire

Phone:
315.671.9233

Email:
pat.mcguire@arcadis-us.com

Our ref:
B0064583.0004.00907

Dear Mr. Krawczyk:

On behalf of Georgia-Pacific LLC (Georgia-Pacific), this document has been prepared to address the detection of methane gas at concentrations above the lower explosive limit (LEL) at permanent perimeter gas probes GW-13 and GW-14, as well as the location of GW-15, each located on the western side of the King Highway Landfill (KHL) of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site (Site). This document will:

- Discuss the detection of methane gas in gas probes GW-13 and GW-14;
- Propose an investigation of the extent of methane gas in the vicinity of gas probes GW-13 and GW-14;
- Propose a new location for gas probe GW-15; and
- Discuss the schedule to implement the proposed actions.

These items are further discussed below:

Detection of Methane Gas in Gas Probes GW-13 and GW-14

During the 2013 1st quarter landfill gas monitoring event, methane gas concentrations detected at permanent perimeter gas probes GW-13 and GW-14 were above the LEL, at 5 percent, in landfill gas samples. Since gas probes GW-13 and GW-14 were installed in October 2011, methane gas concentrations detected at these permanent perimeter gas probes have been above the LEL during each quarterly landfill gas monitoring events (i.e., November 2011 through February 2013). Additionally, monitoring conducted at temporary boreholes installed to the west and north of these

gas probes (along the west sideslope of the KHL; during the aforementioned quarterly landfill gas monitoring events), indicated that methane concentrations above the LEL were detected in several of these temporary boreholes. On January 10, 2013, Georgia-Pacific submitted a work plan to the Michigan Department of Environmental Quality (MDEQ) proposing to further investigate the presence and expression of landfill gas by installing a series of temporary boreholes along the west side of the landfill, adjacent to the landfill property boundary. However, during the February 27, 2013 live meeting, MDEQ indicated that in lieu of the January 10, 2013 investigation work plan, it would prefer to have additional permanent perimeter gas probes installed to the west of gas probes GW-13 and GW-14, and to the north of GW-13 along the western Georgia-Pacific property line.

As such, in accordance with the contingency actions prescribed in Section 3.6 of the current version of the DRAFT FINAL *Operation and Maintenance Plan* (O&M Plan; ARCADIS 2013) and *Landfill Gas Monitoring Plan* (BBL 2002), an investigation plan is required to be prepared and implemented. Section 3.6 of the O&M Plan requires that the investigation plan be implemented in a manner that allows a remediation plan to be implemented within 60 days of the detection of elevated methane gas concentrations.

Proposed Investigation of Methane Gas at Gas Probes GW-13 and GW-14

To address the detection of methane above the LEL at GW-13 and GW-14, four additional permanent perimeter gas probes (GW-18 through GW-21) will be installed along the western property line of the KHL (Figure 1). GW-18 will be located directly west of GW-13, GW-19 will be located about 175 feet northwest of GW-18, and GW-20 will be installed about 125 feet north of GW-19. The 150 feet spacing discussed on February 27 is not practical between GW-18 and GW-19 due to location of the city sanitary sewer between the base of the landfill sideslope and property boundary. GW-21 will be located directly west of GW-14. Figures 2 through 3 provide a cross-sectional view of the proposed additional gas probes GW-18 through GW-21 in relation to the existing subsurface utilities and approximate water table elevation. Each of the permanent perimeter gas probes will be installed to the shallowest measured depth of the water table at the proposed location. Figure 4 provides a typical detail of the permanent perimeter gas probes (i.e., GW-18 through GW-21) to be installed. The detail indicates that the proposed gas probes will be screened to within 3 feet of the ground surface, which will allow for adequate collection of landfill gas within the gas probes.

Prior to installing the aforementioned permanent perimeter gas probes, Miss Dig Systems, Inc. will be contacted to obtain information related to location and depth of

the subsurface utilities potentially located along the western side of the KHL (i.e., underground telephone line, sanitary sewer line, and water line), as existing information regarding their location is approximate.

Following installation, the additional permanent perimeter gas probes will be monitored for landfill gas concentrations using a portable gas analyzer (e.g., GEM-500™) and their locations will be surveyed.

Proposed New Location of Gas Probe GW-15

As indicated by MDEQ during the February 27, 2013 live meeting, the purpose of gas probe GW-15 is to evaluate the potential migration of methane gas along the City of Kalamazoo underground utilities (Figure 1). To serve the intended purpose, MDEQ indicated that gas probe GW-15 should be relocated north to a location between the water and sanitary sewer lines. As such, existing gas probe GW-15 will be decommissioned and a new gas probe GW-15A will be installed approximately 40 feet to the north (on the landfill site, or north of the existing water and east of the sanitary sewer line) as identified on Figure 1. Figure 3 provides a cross-sectional view of the proposed new location of GW-15A in relation to the existing subsurface utilities and approximate water table elevation. Similar to the additional permanent perimeter gas probes, GW-15A will be installed to the shallowest measured depth of the water table at the proposed new location. Gas probe GW-15A will be installed as shown on the typical gas probe installation detail provided on Figure 4.

Schedule to Implement the Proposed Actions

Following MDEQ approval of this work plan, it is anticipated that Terra Contracting, LLC, and ARCADIS will mobilize to the KHL as soon as practicable to install and monitor the proposed additional permanent perimeter gas probes. If the methane gas concentrations in the additional gas probes are detected above the LEL, then a remediation plan will be prepared and implemented within 60 days of the detection of elevated methane gas during the 2013 1st quarter landfill gas monitoring event (i.e., April 22, 2013).

If you have any questions, please do not hesitate to contact me.

Sincerely,

ARCADIS

Patrick McGuire
Principal Environmental Engineer

Copies:
Daria Devantier, MDEQ
Michael Berkoff, USEPA Region 5
Garry Griffith, P.E., Georgia-Pacific
Dawn Penniman, P.E., ARCADIS

Enclosures:

Figure 1	Additional Permanent Perimeter Gas Probe Locations and GW-15 Relocation
Figure 2	Cross Sections A-A', B-B', and C-C'
Figure 3	Cross Sections D-D' and E-E'
Figure 4	Gas Probe Installation Detail

1. References

ARCADIS. 2013. Draft Final – *Operation and Maintenance Plan.* King Highway Landfill Operable Unit 3. February 2013.

BBL. 2002. *Landfill Gas Monitoring Plan.* King Highway Landfill Operable Unit 3. June 2002.

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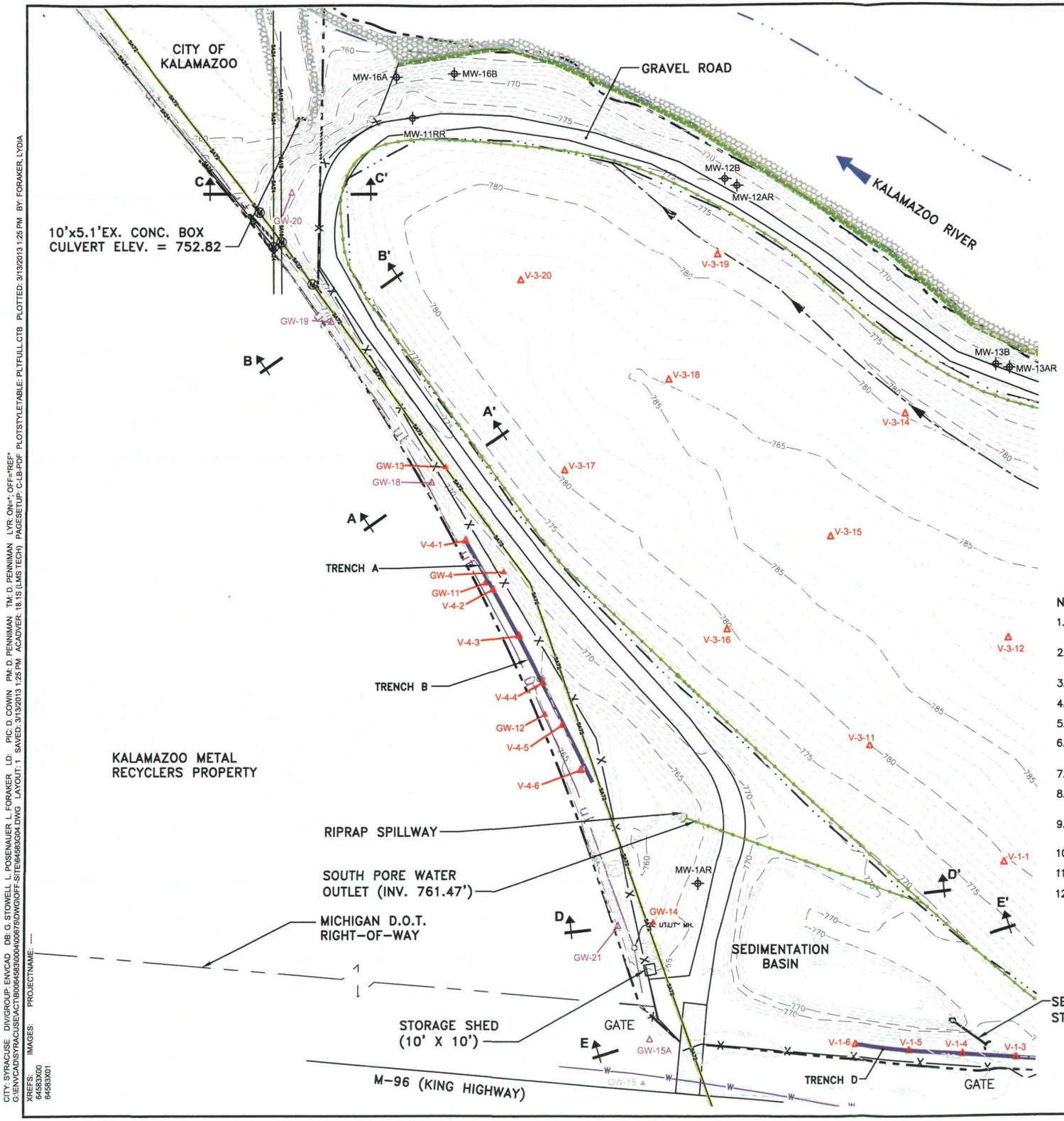
Figures



LEGEND:

- APPROXIMATE OUTSIDE PROPERTY BOUNDARY
- DITCH LINE
- SHEETPILE WALL
- ACCESS ROAD
- RIPRAP
- CULVERT PIPE
- 768 FINAL AS-BUILT INDEX CONTOUR
- FINAL AS-BUILT INTERMEDIATE CONTOUR
- X SECURITY FENCE
- SA18 18" DIAMETER SANITARY SEWER LINE
- SA24 24" DIAMETER SANITARY SEWER LINE
- SA72 72" DIAMETER SANITARY SEWER LINE
- SANITARY MANHOLE
- PORE WATER COLLECTION PIPE
- PORE WATER DRAIN
- ut EXISTING UNDERGROUND TELEPHONE
- W APPROXIMATE LOCATION OF CITY WATER LINE
- APPROXIMATE WATER EDGE
- V-1-2 GAS VENTS
- LANDFILL GAS CUTOFF TRENCH
- FLOW DIRECTION
- MW-14 MONITORING WELL
- GW-2 LOCATION OF GAS MONITORING PROBES
- GW-18 PROPOSED PERMANENT PERIMETER GAS PROBE LOCATION
- GW-15 EXISTING GAS PROBE TO BE DECOMMISSIONED

NOTES:

1. BASE MAP INFORMATION OBTAINED FROM CADD DRAWING FILE DEVELOPED BY RMT, INC., ANN ARBOR, MICHIGAN (CADD FILE: L1630SU01.DWG AS-BUILT SURVEY; 8/21/00).
2. FINAL AS-BUILT CONTOUR ELEVATIONS ARE SHOWN AND ARE BASED ON A FIELD SURVEY BY ATWELL-HICKS, INC., DATED 9/27/00 WITH REVISIONS DATED 10/23/00, 12/21/01, 12/10/02, AND 7/24/03.
3. ELEVATIONS ARE BASED ON NGVD OF 1929 (MSL).
4. PROPERTY SURVEY PERFORMED BY WILKINS & WHEATON ENGINEERING CO., INC., ON 7/1/96.
5. TOPOGRAPHIC CONTOUR INTERVAL IS 1 FOOT.
6. LOCATIONS OF GW-5, GW-6, GW-7, AND GW-10 ARE BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 9/23/05.
7. LOCATION OF GW-11 IS BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 1/11/06.
8. LOCATIONS OF V-4-4, V-4-5, AND V-4-6 ARE BASED ON A FIELD SURVEY BY TERRA CONTRACTING LLC, DATED 6/7/06.
9. LOCATIONS OF V-1-2 THROUGH V-1-6, V-2-3, AND V-2-10 ARE BASED ON MULTIPLE FIELD SURVEYS CONDUCTED BY TERRA CONTRACTING, LLC. IN APRIL 2008.
10. LOCATION OF GW-12 IS APPROXIMATE.
11. *LOCATIONS OF GW-13 THROUGH GW-15 BASED ON FIELD SURVEY CONDUCTED BY PREIN & NEWHOF ON 11/1/11.*
12. LOCATION OF SANITARY SEWER LINES ARE BASED ON CAD DRAWING FROM THE CITY OF KALAMAZOO DATED 11/1/2009 AND HISTORIC DRAWINGS FROM THE CITY OF KALAMAZOO DEPARTMENT OF PUBLIC WORKS DATED MARCH 1970.

0 100' 200'

GRAPHIC SCALE

ALLIED PAPER, INC/PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE

INVESTIGATION PLAN FOR OFF-SITE LANDFILL GAS MIGRATION AT THE KING HIGHWAY LANDFILL

ADDITIONAL PERMANENT PERIMETER GAS PROBE LOCATIONS AND GW-15 RELOCATION

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FIGURE 1

CITY: SYRACUSE DIV/GROUP: ENVCAD DB: G.STOWELL L: POSENAUER, L.FORAKER LD: PIC: D.COWIN PM: D.PENNIMAN TM: D.PENNIMAN LYR ON=*; OFF=*REF*
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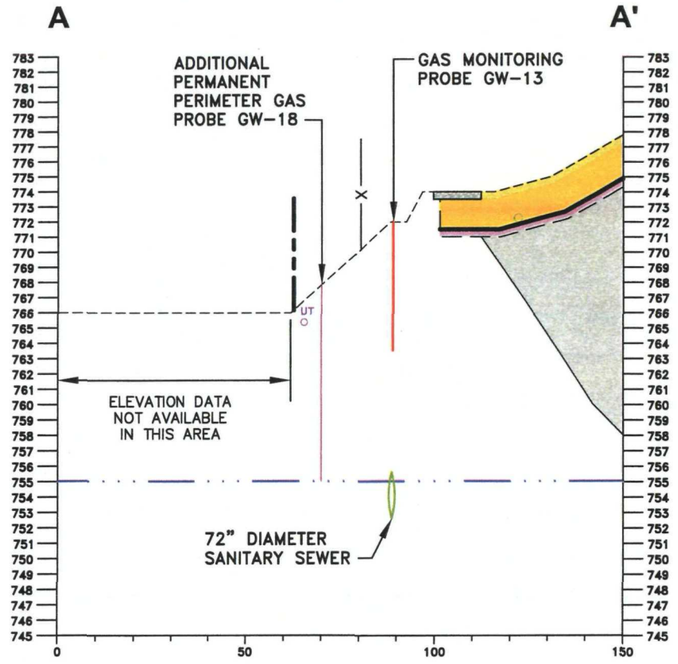
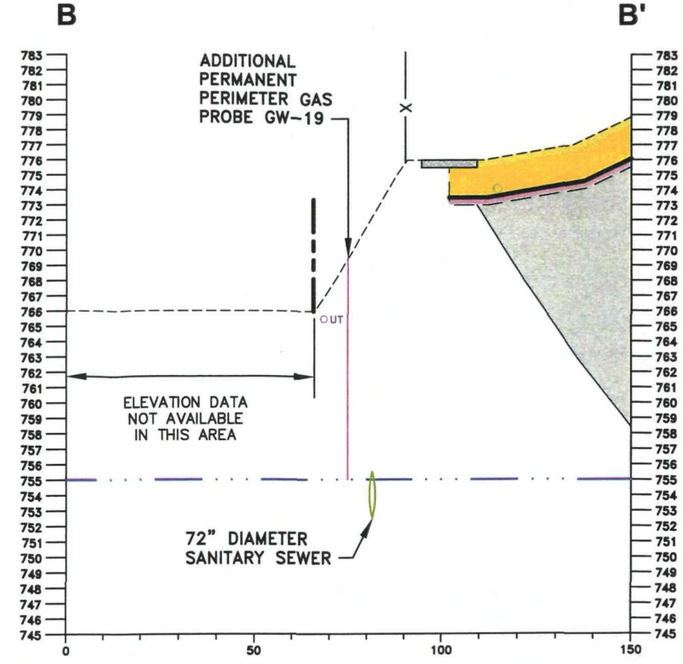
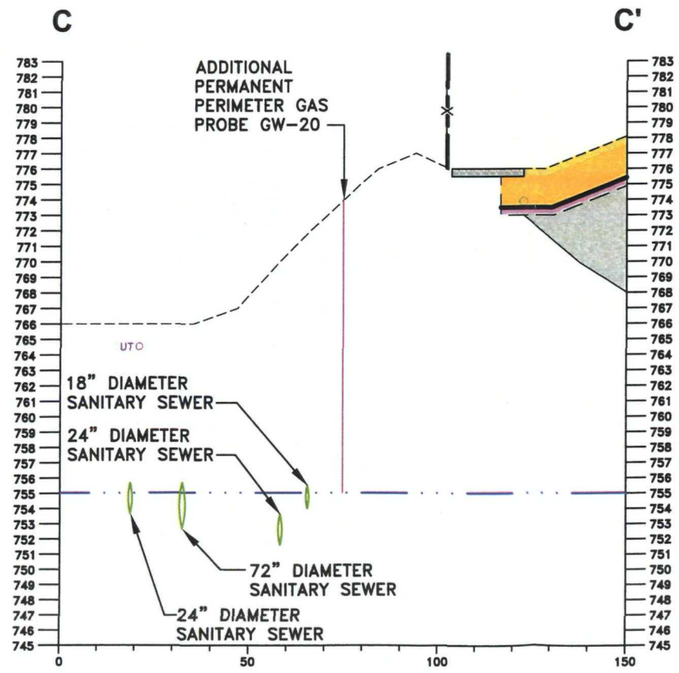


CROSS SECTION A - A'



CROSS SECTION B - B'



CROSS SECTION C - C'

LEGEND

- PORE WATER COLLECTION PIPE
- APPROXIMATE PROPERTY BOUNDARY
- SITE SECURITY FENCE
- GRAVEL ACCESS ROAD
- RESIDUALS
- EXISTING UNDERGROUND TELEPHONE (SEE NOTE 3)
- APPROXIMATE EXISTING GROUND SURFACE
- APPROXIMATE WATER TABLE

FINAL COVER SYSTEM

- VEGETATIVE LAYER
- BARRIER PROTECTION LAYER
- FLEXIBLE MEMBRANE LAYER
- GAS VENTING LAYER

NOTES:

1. CROSS SECTION IS EXAGGERATED VERTICALLY 4 TIMES FOR CLARITY.
2. ALL LOCATIONS AND DEPTHS ARE APPROXIMATE AND HAVE BEEN SHOWN FOR *ILLUSTRATIVE PURPOSES ONLY.*
3. THE EXISTING UNDERGROUND TELEPHONE LINE HAS BEEN SHOWN UNDERNEATH THE GROUND SURFACE; HOWEVER, THE ACTUAL DEPTH BELOW THE GROUND SURFACE IS UNKNOWN.

0 40' 80'
HORIZONTAL GRAPHIC SCALE

0 10' 20'
VERTICAL GRAPHIC SCALE

ALLIED PAPER, INC/PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
INVESTIGATION PLAN FOR OFF-SITE LANDFILL GAS MIGRATION AT THE KING HIGHWAY LANDFILL

CROSS SECTIONS A - A', B - B' AND C - C'

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FIGURE **2**

CITY: SYRACUSE DIV/GROUP: ENVCAD DB: G. STOWELL L. POSENAUER L. FORAKER LD: PIC: D. COWIN PM: D. PENNIMAN TM: D. PENNIMAN LYR: OFF=*;ON=*;OFF=*REF*
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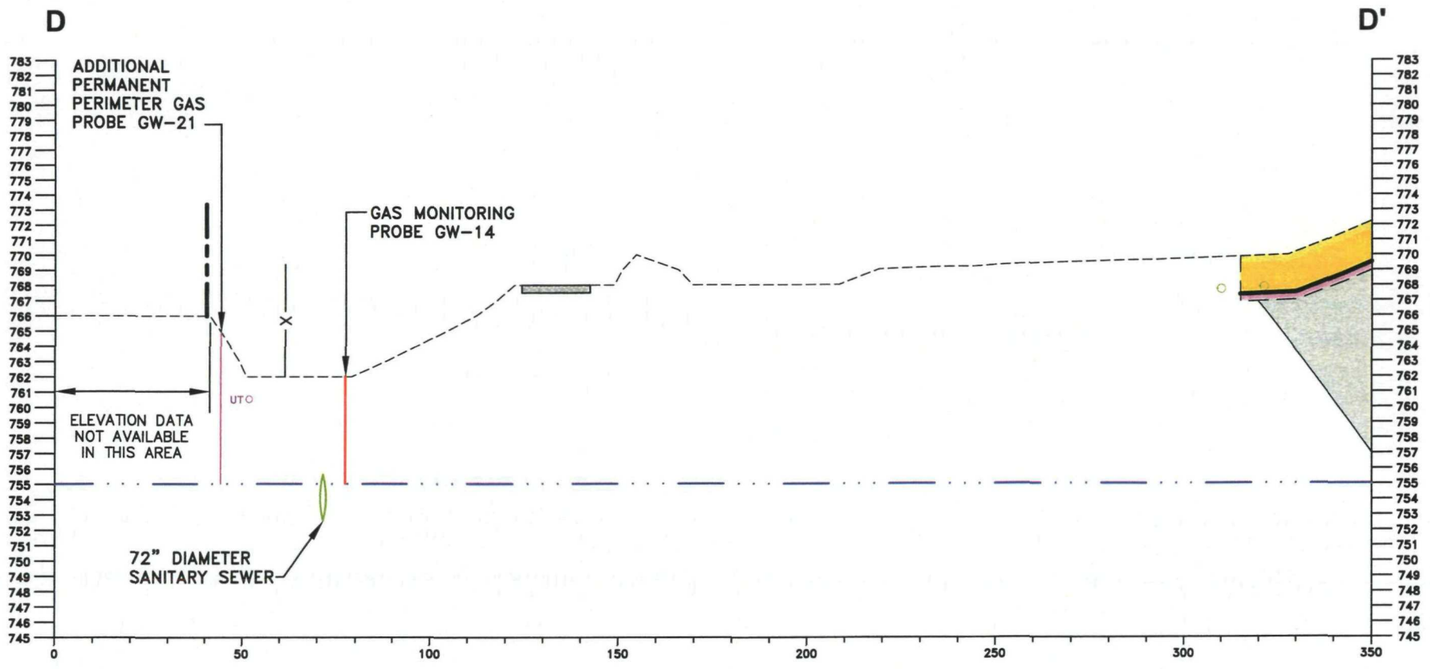
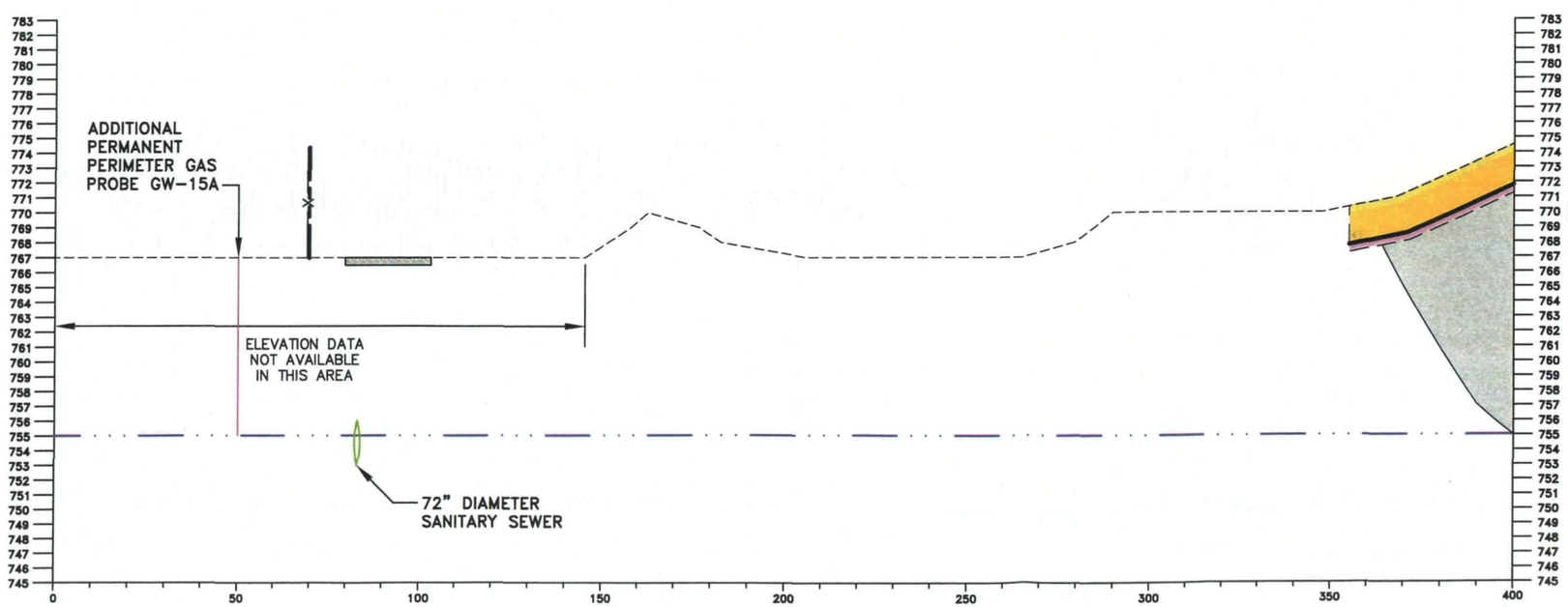


CROSS SECTION D - D'



CROSS SECTION E - E'

LEGEND

- PORE WATER COLLECTION PIPE
- APPROXIMATE PROPERTY BOUNDARY
- SITE SECURITY FENCE
- GRAVEL ACCESS ROAD
- RESIDUALS
- UT — EXISTING UNDERGROUND TELEPHONE (SEE NOTE 3)
- APPROXIMATE EXISTING GROUND SURFACE
- APPROXIMATE WATER TABLE

FINAL COVER SYSTEM

- VEGETATIVE LAYER
- BARRIER PROTECTION LAYER
- FLEXIBLE MEMBRANE LAYER
- GAS VENTING LAYER

NOTES:

1. CROSS SECTION IS EXAGGERATED VERTICALLY 4 TIMES FOR CLARITY.
2. ALL LOCATIONS AND DEPTHS ARE APPROXIMATE AND HAVE BEEN SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.
3. THE EXISTING UNDERGROUND TELEPHONE LINE HAS BEEN SHOWN UNDERNEATH THE GROUND SURFACE; HOWEVER, THE ACTUAL DEPTH BELOW THE GROUND SURFACE IS UNKNOWN.

0 40' 80'
HORIZONTAL GRAPHIC SCALE

0 10' 20'
VERTICAL GRAPHIC SCALE

ALLIED PAPER, INC/PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE

INVESTIGATION PLAN FOR OFF-SITE LANDFILL GAS MIGRATION AT THE KING HIGHWAY LANDFILL

CROSS SECTIONS D - D' AND E - E'

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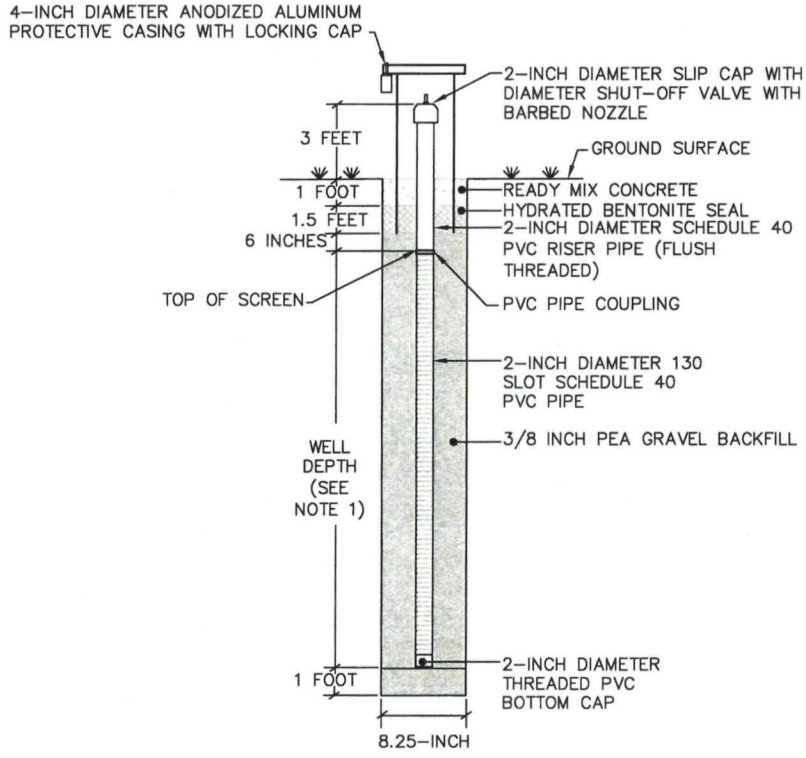
FIGURE 3



NOTE:

1. GAS PROBE SHALL BE INSTALLED TO WATER TABLE (I.E., WHEN WET CONDITIONS ARE ENCOUNTERED).

GAS PROBE INSTALLATION DETAIL

NOT TO SCALE

ALLIED PAPER, INC/PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
INVESTIGATION PLAN FOR OFF-SITE LANDFILL GAS MIGRATION AT THE KING HIGHWAY LANDFILL

GAS PROBE INSTALLATION DETAIL

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FIGURE
4